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PUBLIC HEALTH REPORTS.

THE PROPHYLAXIS OF PELLAGRA.

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The prophylaxis of any disease must necessarily depend upon its cause, and with equal necessity the efficiency of prophylactic measures must be in ratio to the definiteness of our knowledge regarding such cause.

First, then, what do we know of the cause of pellagra? Do we possess any knowledge of its cause so definite and accurate that it may be applied efficiently in the institution of general prophylactic measures?

Broadly speaking, we may divide the theories as to the etiology of pellagra into two large groups, viz, those of the Zeists, who think there is some definite etiologic relation between Indian corn and pellagra, and those of the Antizeists, who oppose this view.

In the latter group there is really but one body of students, and that is composed largely of the French school, who deny that pellagra is a morbid entity and regard it only as a symptom complex occurring in alcoholics, insane persons, and in persons in other depressed states. This idea, for our present purposes, may be disregarded.

The Zeists include nearly all students of the disease, but their views are by no means harmonious. Putting it in a general way, their various ideas as to the etiology may be placed in three general divisions: (1) That it is an intoxication (toxico-chemical); (2) that it is an autointoxication (toxico-infective); (3) that it is a specific infection either by bacteria, moulds, or protozoa. All these variations, however, it must be noted, take into more or less essential consideration the relation of the disease to corn; the intoxication, the autointoxication, or the infection being in some more or less definite way regarded as usually connected with or derived from that grain.

It must be added, however, that while in most of these theories corn is regarded as an essential factor in the etiology of the disease, in others this cereal is not regarded as an absolute necessity, although much importance may be attributed to it. (Ceni).

Taking this general view of the etiology of the malady, what shall be said concerning the communicability of pellagra? This is a very natural and a very important question, and to some minds in this country has become indeed a very acute inquiry. In attempting to answer this question to our satisfaction we should not forget, as we are very likely to do, that while pellagra is a new disease to us it is an old problem to many other countries and has attracted the attention and occupied the minds of many able men. This question has,

of course, arisen among them, too. What is their answer? It has been given many times in the negative. And, what is more, their conviction has been carried into practice for, so far as I am aware, quarantine, and measures of isolation have not been put into practice in the prophylaxis of pellagra in those countries which have suffered most from its ravages.

Holland,^a after a trip through Italy observing pellagra, states that the question of the communicability of the disease can be answered decidedly in the negative.

Roussel,^b the great French student of pellagra, says, speaking of contagion in this disease:

Although the hypothesis of a pellagrous virus has had a place in the discussions of the last century, and has even appeared in divers authors of our own time, it has seemed to me useless to try to refute it. It can be said of the contagion of pellagra that it is a question fully determined * * * pellagra is not contagious.

Procopiu^c says:

The disease is not contagious and the sick may associate intimately and freely with the well; and if spoiled maize is not eaten, the disease does not occur.

Cutting (unpublished consular report), while not a medical man, made an extensive report on pellagra, after personal observation and study in Italy, and his opinion may be taken to represent, to some extent at least, the Italian belief on this point. He says:

Pellagra is neither infectious nor contagious. It is transmissible, like insanity, in the form of a previous disposition.

Arnould,^d in discussing contagion and infection in pellagra, says that there are a great many facts connected with the disease which might incline one to consider it to be infectious, but not necessarily transmissible from man to man. He further says that spoiled maize seems to him to play a rôle so real and so large that any other supposition at present would involve questions and open up perspectives at which he hesitates. He also adds, in speaking of hereditary transmission, that this is the only means of conveyance from man to man, and that besides this, up to the present, the pellagra "germ" is only a metaphor.

Statements on this point are wanting in many writers. The reason is evident. The general conception of the nature of the disease at once forbids any idea of its communicability. Obviously it would be foolish for those who entertain the intoxication or autointoxication idea of the disease to consider its communicability, and as for those who regard it as a specific infection, an analysis of their complete views would likewise render quarantine or isolation unnecessary. The one possible exception would be the suggestion that the disease may be due to an insect-borne, protozoal parasite, and in this case the absence of any definite knowledge as to the nature of the insect would in all likelihood render quarantine and isolation ineffective.

There are several very good reasons just now why this question of communicability should have arisen to much importance in this country; but I do not think they will stand the test of careful examination. In the first place, the disease has arisen and grown to large

^a Medico-Chirurgical Transactions, London, 1820.

^b *Traité de la pellagre*, Paris, 1866.

^c *La Pellagre*, Paris, 1903.

^d *Dict. Encyc. des Sc. Med.*, Pellagre, p. 360-362.

proportions, apparently like the proverbial mushroom, almost in a single night. It is something new, a malady with which we are not familiar, and in some of its manifestations is repulsive, if not actually loathsome; indeed, some of the older writers, evidently struck with this fact, applied to it the name leprosy, a term which, since the days of Moses, has been a synonym to mankind of all that is repulsive and loathsome in human disease. Then, too, it has been associated in our minds very frequently with mental alienation, a state naturally abhorrent to all; and its reported death rate has been very large indeed. Furthermore, the indefinite and pervasive character of its etiology, with the lack, not only of any specific treatment, but the apparent inefficacy of all treatment, has added further color to an already vivid picture.

All these features have given to the disease an air of strangeness, not to say of actual mystery, which has made a strong appeal to the public mind and which has probably, to a certain extent, reacted upon the professional mind. The result in certain communities has been to produce a very uneasy state of feeling, almost an hysterical condition, at times actually bordering on panic.

This seems very natural, but it is very unfortunate, for an analysis of the situation will not bear out the appearances. Its seeming rapid origin and growth among us is only apparent, not real. While there is evidence of the increasing prevalence of pellagra, there is also undoubted evidence that the disease has existed here for 30 or 40 years, and perhaps much longer. During this time many cases have developed, and the present reports of numbers of patients from various sections of the country very probably mean to a great extent the discovery of already existing cases as knowledge widens and skill in diagnosis develops among a profession hitherto largely unfamiliar with the subject. This may seem strange, but is in all likelihood a repetition of what has occurred at other times and in other places where the disease has been recognized for the first time.

Then the disease, in the vast majority of cases, does not present the horrible and revolting aspect so evident in a few; and mental alienation occurs only in a rather small percentage of cases. The mortality, too, is not so large as it would seem to us. We should not forget that our experience is brief and is largely based on asylum cases—the last stage of the most hopeless type of this disease.

Treatment likewise is not so hopeless by any means as it would seem to be, and the absence of any specific treatment for the disease is too common a fact among all diseases to occasion even comment when we must deal with one more in the same class; and, so far as etiology is concerned, the same remark might be made. Our knowledge on this point is just as definite and just as satisfactory as that for scores of other well-known diseases.

Of course the definite question, "Is pellagra contagious or infectious, or even communicable?" can not receive a categorical negative. To such a question one must of necessity answer, "I do not absolutely know." In considering such a question as quarantine in connection with the disease, while we can not give such a decided opinion, we can at least say that, from the accumulated observations of other able men with very extensive experience, we regard quarantine as unnecessary and probably unjustifiable.

There are scores and hundreds of observations all going to show that apparently the disease is not a communicable one; and the Italian authorities, who have had such wide experience and have made so long a struggle with the malady, have not yet, in all their fight for its limitation and eradication, adopted quarantine or isolation measures. Surely if they entertained even the slightest suspicion of its transmissibility from man to man they would not have neglected so important a matter.

I have perhaps said more on this point than it really warrants, but being myself a public health officer I am too keenly sensible of the hardships induced by quarantine measures willingly to see such procedures adopted when they seem unnecessary.

Quarantine of such cases in one way may do no harm and may be, it can be argued, nothing more than a precautionary means on the side of extreme safety. But surely this is poor reasoning for the adoption of such radical measures. There are in the whole United States how many cases of pellagra? The highest figure would place them at about 5,000. Estimating on the basis that 10 per cent of pellagra patients finally show sufficient mental involvement to enter asylums, this would give us a grand total of some 10,000 to 12,000 cases, the mortality of which we can not as yet even guess.

When one comes to consider the statistics of other well-known communicable diseases in which quarantine measures are not adopted, the force of this fact can be appreciated. Take typhoid fever, for example: There are probably each year not less than 35,000 deaths in the United States from this affection which, with the accepted mortality rate of 10 per cent, would mean an annual total of 350,000 cases of this readily communicable disease. Yet such cases are not only not quarantined, but, as one can readily imagine, efficient methods for prevention of this disease are not at all generally applied.

Hookworm disease is another striking example. Doctor Stiles states that there are about 2,000,000 of the southern rural population infected with this parasite, among whom there is probably, either directly or indirectly, a very high mortality. This is another communicable disease. These cases are not quarantined, and again no efficient general measures of prophylaxis are in existence.

It is almost a platitude to add tuberculosis, another communicable disease, with its enormous morbidity and mortality. Here again we do not adopt quarantine measures, though we do to some extent adopt isolation.

The real point of all this is, Why should we wish to adopt harsh measures in a disease which, according to all opinion, is not a communicable one when so many other important and communicable diseases are accepted as a matter of course?

Before leaving this point it is desired to be thoroughly understood. I am speaking of pellagra only with regard to its communicability, and what I have said does not minimize in the slightest degree the great importance of pellagra either as a clinical difficulty or as a public health problem. In all likelihood the disease will, according to its nature, steadily increase both in the number of cases affected and in the extent of territory involved. But such considerations as have been noted should not be forgotten lest we lose our sense of due proportion and distort our mental perspective.

Leaving aside this phase of the subject, however, there is another very important question which has a most practical bearing on the prophylaxis of pellagra and which appeals to us all. This question is, What advice shall be given and what measures adopted with regard to the use of corn as an article of diet?

In attempting to answer such a question to our satisfaction we must of course at the outset admit, it seems to me, that our own practical experience with the disease is too brief and too limited to permit our personal observations to have great weight. We are, to a large extent, forced to depend upon the conclusions of others. Moreover, pellagra is not an acute condition, but a very chronic one; and it would seem evident, as many have stated, that it takes not months but years of feeding on spoiled corn before a community begins to develop the disease.

Then, too, while theoretically a sharp distinction is drawn between spoiled corn and good corn, yet practically we are confronted with a very real difficulty in trying to determine which is spoiled and which is good corn. Such a distinction, while extremely important, is by no means easy, and the tests for such differentiation are not entirely satisfactory. Good corn is a very valuable cereal, and to advise that the use of all corn be totally suspended is not only impracticable but would seem unnecessary.

These are very practical facts, the full solution of which awaits further efforts; but even now the general distinction between good and spoiled corn may, for most purposes, be very fairly determined.

Bearing in mind these considerations, it seems to me that the accumulated work and observations of scores of able men who have had long and extensive experience with pellagra, both as a clinical and a public health problem, should have much weight with us.

Admitting that much of the evidence may seem evasive, unsatisfactory, or inconclusive, nevertheless when we take into consideration the generally accepted statements that pellagra was unknown in Europe before the introduction of Indian corn; that it is an endemic disease confined largely at least, if not exclusively, to populations which grow and eat corn and more especially to those who, through force of circumstances, eat poor grades of corn; that by far the great majority of all thinkers and students believe the disease is, in some definite if at present rather ill-defined way, connected with the use of corn as a foodstuff; that the Italian and other authorities, in all their attempts to limit and eradicate the disease, base their prophylactic measures almost wholly upon this theory, and that as an outcome of such measures good results are claimed—when all these things are given just and due consideration, it seems to me that we must, for the present at least, recognize some relationship between corn and pellagra; and in dealing with a disease of such gravity we must make use of such relationship in our prophylactic measures.

In other words, under such circumstances and conditions, the burden of proof for the present must, it seems to me, rest upon those who deny the influence of corn. Notwithstanding the fact that in the history of medicine the profession has been led into many serious errors through deductions made from false observations, we are in no position now totally to disregard such evidence as is submitted for an etiological relation between corn and pellagra; and in my opinion

we must take full cognizance of it in our prophylactic measures, as well as in our curative ones.

Adopting this conclusion, then we might, for our profit, inquire very briefly into the prophylactic measures adopted by other countries, notably Italy, a country which has suffered much from pellagra and has made and is making a determined fight against the disease.

Passing over earlier efforts, the Italian struggle against pellagra has culminated in the law of 1902 for "The prevention and cure of pellagra."^a The dispositions of this act are of two kinds—curative and preventive. The former includes such measures as free distribution of salt (a government monopoly in Italy), administration of food either at the homes of the patients or through sanitary stations (*locande sanitarie*), treatment of severe cases in hospitals for pellagrins (*pellagrosarii*) and in insane asylums, etc. With this feature of the bill we are not now concerned.

The prophylactic measures are more numerous, and they are all directed against the use of spoiled corn as an article of food. As Mr. Cutting aptly says: "The cause of pellagra, while scientifically uncertain, is practically, and for Italy, ascertained." The measures comprise, besides a census of the disease and a report of all cases, the testing of corn and meal brought in at the frontiers or offered for sale or brought to the mill, and the prohibition of its sale for food if found spoiled; the exchange of good corn for spoiled corn; desiccating plants; cheap cooperative kitchens; the improvement of agriculture; and the education of the people.

By the provisions of the law all corn is inspected by experts and is submitted to certain tests; if found spoiled, its sale for food is prohibited. The tests are not entirely satisfactory from a scientific standpoint perhaps, but seem sufficient for practical purposes. They include such things as the determination of the proportion of ashes after burning, Gosio's phenolic reaction with ferric chloride, the germination test, and the general physical properties of the grain, such as appearance, smell, and taste.

The weak point in the inspection of corn seems to be in dealing with home-grown corn, especially the meal, either at the mill or on the markets. There seems to be no solution of this difficulty except governmental ownership of the mills, and this proposal is supported by many.

The *cattedre ambulante* (moving chairs), or "farmers' institutes," are of much importance in educating the farmers in agricultural methods, and these institutions have contributed a great deal to agricultural progress in Italy in the last few years. In regard to corn they teach the use of better varieties, proper methods of culture, etc., or how to supplant corn entirely with a more profitable crop.

The desiccating plants for the artificial drying of corn is considered a very important prophylactic measure, as it prevents the spoiling of the grain. These desiccators are of two types, fixed and portable, and there are a large number of public desiccators throughout Italy. There is also a provision in the law for public storehouses, properly

^a For information regarding this law and its application I am very much indebted to an official unpublished report on pellagra by W. Bayard Cutting, jr., at one time American vice-consul at Milan, Italy. I have made very free use of this excellent report.

constructed, where the grain may be stored under the best conditions to prevent spoiling.

Rural bakeries (*forni rurali*) and economic kitchens (*cucine economiche*) are establishments where an effort is made to eliminate from the peasants' diet any bread made of corn, by supplying good wheat bread and other food at a low cost.

The corn exchanges are devoted to the exchange, under certain conditions, of good meal for poor corn, to prevent the peasants eating the spoiled grain.

There are many other agencies used in the fight against pellagra, but these will give an idea of the general scope of such a struggle.

Above all such work as this, however, stands the education of the people to the dangers of spoiled corn and the healthfulness of a varied diet and better living conditions. A great deal has been done in this way; popular pamphlets are distributed, popular lectures are held everywhere, the school children are taught the dangers of spoiled corn, and the pellagrologic and the agricultural commissions of the different provinces are indefatigable in their propaganda against the spoiled grain.

The results of such work, only a brief sketch of which has been given, seem on the whole very encouraging, but their interpretation is difficult by reason of other contemporaneous developments. They coincide with a marked rise in general prosperity. The laborers and peasants now can eat better food than ever before; numbers of the rural population are employed in industrial institutions, where they receive a varied diet; temporary emigration has reflexly widened the view of the peasant class, and they demand and get better food and living conditions; the consumption of meat is increasing, and wages are higher. Such things must, of course, in a disease like pellagra, have a very profound effect.

Statistics, as may be seen from the following figures,^a undoubtedly show a decrease in pellagra:

Total number of pellagrins in Italy, by census.

1879.....	97, 855
1881.....	104, 067
1899.....	72, 603
1905.....	55, 029

Total deaths from pellagra in Italy.

1898.....	3, 987
1900.....	3, 788
1904.....	2, 363
1906.....	439
1907.....	376

For many reasons, statistics are not entirely satisfactory and do not serve to show the actual state of the case. The opinions of those actively engaged in the work and in close touch with the situation, however, are in general that pellagra in Italy is notably decreasing both in numbers and in intensity. Strange as it may seem, however, the disease is increasing its area, and parts of Italy previously free from pellagra are now developing the disease. The cause of this is not apparent.

^a Cutting, loc. cit., and Wollenberg, Public Health Reports, July 23, 1909.

In conclusion, it seems to me we may say that there is no evidence that pellagra is a communicable disease, and quarantine measures, in the present state of our knowledge, would appear unnecessary; that, unless we can disprove it, we must for the time at least accept the existence of some connection between corn and pellagra, and in our efforts at prophylaxis we must take cognizance of the alleged effect of the use of this grain as human food; that our own experience is too limited and too brief for us to base on our own observations as yet any new theories as to etiology; and that we can not afford, either with regard to etiology or to prophylaxis, to reject the observations and deductions of those who have had a far wider and fuller experience than ourselves.

UNITED STATES.

[Reports to the Surgeon-General, Public Health and Marine-Hospital Service.]

PELLAGRA.

LOUISIANA.

The board of health of the city of New Orleans reports 4 deaths from pellagra for the month of September.

MARYLAND.

The state board of health reports that a death from pellagra, the first recorded in the State of Maryland, occurred at the Baltimore City (now Mercy) Hospital August 20. The patient was a white woman who had been a lifelong resident of Charles County.

NORTH CAROLINA.

The state board of health reports that during the month of August cases of pellagra were reported in the following counties: Bladen 2, Caswell 1, Guilford 2, Lenoir 4, Robeson 4; Warren, number of cases not given.

Reports from San Francisco—Plague-prevention work at San Francisco, Oakland, and Point Richmond, Cal.

Surgeon Blue reports:

SAN FRANCISCO, CAL.

Last case of human plague: Sickened, January 30, 1908.

Last case of rodent plague: October 23, 1908.

Week ended October 9, 1909.

Dead inspected.....	120
Plague.....	0
Premises inspected.....	2, 046
Houses disinfected.....	7
Buildings condemned.....	18
Nuisances abated.....	267
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Rats found dead.....	26
Rats trapped.....	2, 045
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Total rats taken.....	2, 071
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